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plantations of Guatemala. Where several such varieties from other parts of the world have also been tested, the new sorts offer great diversity in other respects, but agree in being less fertile than the parent stock in actual amount or weight of seeds. It seems reasonable to associate this relative or complete sterility with the fact that coffee has been unintentionally inbred, new regions having usually been stocked from single trees, and it is further noted that reproductive debility is a general characteristic of other inbred domestic plants and of the so-called 'sports' or 'mutations' which appear among them. In other words, it is suggested that both the sterility and the mutations may be due to the same cause, the absence of normal cross-fertilization. This interpretation accords with what has been called a kinetic theory of evolution under which evolution is viewed as a physiological as well as a morphological process.

THE tenth regular, and second annual, meeting of the Botanical Society of Washington was held at the Portner Hotel, November 8, 1902, with President A. F. Woods in the chair. No regular program had been prepared, the evening being given over to the election of officers and the consideration of general business. The following officers were elected for the ensuing year: *President*, A. F. Woods; *Vice-president*, Frederick V. Coville; *Recording Secretary*, Charles L. Pollard; *Corresponding Secretary*, Herbert J. Webber; *Treasurer*, Walter H. Evans.

HERBERT J. WEBBER,
Corresponding Secretary.

DISCUSSION AND CORRESPONDENCE.

THE GRAND GULF FORMATION.

TO THE EDITOR OF SCIENCE: I am naturally much interested in the communication of Messrs. Smith and Aldrich in your issue of November 21, and, as in the main it confirms my earlier determinations, yet does not correctly state either my position or that of Dr. Hilgard in more recent publications, I venture to supplement it by some words of explanation.

The original complex included under the name of Grand Gulf by Hilgard in 1860 was heterogeneous, but, in the absence of paleontological data, it could not be in its several parts correlated with other beds of known age. This of course led to various, sometimes conflicting, estimates of its place in the column. Professor Hilgard's last characterization of it (*Am. Journ. Sci.*, 3d ser., XXII., p. 59) is as follows: 'Clearly the Grand Gulf rocks alone represent, on the northern borders of the Gulf, the entire time and space intervening between the Vicksburg epoch of the Eocene and the stratified (Quaternary) drift.' We now call the Vicksburgian 'Oligocene,' so it is hardly fair to represent Dr. Hilgard as referring the Grand Gulf *at present* to the Eocene. Neither have I 'referred it' at different times 'to the Eocene, the Oligocene and the Miocene.' By means of paleontological data which have come in from time to time during the seventeen years I have been at work on our southeastern Tertiary, and to which no one has been more active in contributing than Professor Smith and Mr. Aldrich, I have been enabled to fix the age of *different portions* of the original heterogeneous series, as uppermost Oligocene (transitional) and Chesapeake Miocene, which is fully confirmed by the facts now cited by your correspondents. But there are still considerable portions which have yielded no fossils, and the age of which can only be inferred from their position in relation to other beds of known age. In 1898 ('Fifteenth Annual Report U. S. Geol. Survey,' part II., p. 340 and table) I was obliged to decide on some portion of the original Grand Gulf which should continue to bear the name, after deduction of beds of which the age had been determined, and fixed upon the Oligocene clays containing lignite and fossil palm leaves, the only fossils cited by Hilgard in his original description; and in my table of Tertiary horizons referred to them as 'Typical Grand Gulf.' The beds which Messrs. Smith and Aldrich call 'Grand Gulf' in their communication to SCIENCE are not the same, but are the non-fossiliferous upper portion at the other end of Hilgard's Grand Gulf section. I have

little doubt that their assumption as to the late, possibly Pliocene, age of these beds is correct, though it can only be proved by further and paleontological evidence, but this decision is merely an equivalent of the ideas above cited from Hilgard, and therefore not new.

That the Pascagoula horizon is Miocene rather than Pliocene is probable from the character of its scanty fauna, which is not of the sub-tropical type of the Pliocene of our southern coast, but indicates a cooler temperature, such as prevailed during the Miocene of that region.

The very great difficulties which the southern coastal plain offers to geological study are sufficient excuse for the slow progress which has been made, but it cannot be too often emphasized that no determination of the age of its beds not based on their fauna, or the fauna of beds both above and below those in question, can be regarded as more than tentative; and such determinations in the past have almost invariably proved erroneous.

WM. H. DALL.

THE SQUIDS FROM ONONDAGA LAKE, N. Y.

A FEW days since the newspapers told a story of how a citizen of Syracuse, while drawing a net in Onondaga Lake, got a strange looking fish, which upon being brought to Professor John D. Wilson, a well-known teacher of science in the city, was pronounced a squid. Professor Wilson has followed up this discovery, lest perchance some one connected with the affair were not too wise to be mistaken or too honest to deceive, and he assures me that he and his scientific friends are satisfied of the genuineness of this find. Professor Wilson learned from Mr. Terry, the discoverer, that he caught the creature in a net while fishing for minnows in shallow water. A second specimen was afterward found at the same place by a Mr. Lang who keeps a restaurant on the iron pier at the southeast corner of the lake. Both, as I understand, were caught alive. The first specimen was cooked (!) and then put in alcohol, the second is now in possession of the writer. The whole story makes a 'devilish

fishy' first impression. Should there be no reason to doubt the verity of the discovery, its bearings are most suggestive. The place where the squids were found, Professor Wilson says, is just where the first salt springs were discovered and the first salt made in the Syracuse region by the early settlers long before salt wells were bored. Onondaga Lake is a shallow body resting on the Salina shales and unquestionably receiving at all times a considerable amount of saline seepage from the rocks below; for all we know to the contrary its bottom layers may be decidedly saline. These squids are not to be at once cast out as a 'fake' simply because they are marine animals alleged to have been caught in a fresh-water lake. Too many similar occurrences are known at the present to justify such procedure. There was a time in post-glacial history when there was communication from this body of water to the sea by the way of the St. Lawrence valley. It is within the limits of possibility that at such a time marine animals entered the present basin of Onondaga Lake as they did that of Lake Champlain, and that the saline condition of the lake waters has permitted their existence till the present. If such a presumption can be verified it will be by additional discoveries of these creatures supplemented by expert zoological determination of the specific characters and possible variations of these specimens, so that this discovery may prove to have a very important paleontologic bearing. Professor Wilson calls attention further to the fact that there are several hotels about the edge of the lake from which oyster and clam shells are thrown into the lake waters, but it hardly seems that this fact opens a possibility for the introduction by this means of the eggs of one of our Atlantic squids into conditions which would permit of their hatching. There are a number of considerations to be carefully weighed before the genuineness of this discovery can be accepted; if it is the work of some wag, he has shown acuteness in selecting Onondaga Lake rather than any other of the lakes of New York state. As very much, perhaps all, will depend upon the determinations of the zool-